MANUAL ANNOTATIONS USING CLUSTERING, ANCHORING, AND TRANSFORMATION

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims priority to U.S. Provisional Patent Application No. 62/648,301, filed Mar. 26, 2018, entitled "Manual Annotations Using Clustering, Anchoring, and Transformation," the contents of which is incorporated by reference in its entirety for all purposes.

BACKGROUND

[0002] The present disclosure relates generally to manual annotations of electronic documents, such as annotations generated from a stylus and displayed on an electronic display showing an image of the electronic document.

[0003] Electronic documents may be created using applications, such as word processing applications, spreadsheet applications, presentation applications, graphics applications, and notetaking applications, among others. Data for the electronic documents may be inputted via input devices, such as a keyboard and mouse, and via network resources. One may print a physical copy of the electronic document for offline review by the creator or another. The physical copy of the electronic document may be annotated during review. Unfortunately, the annotations on the physical copy are static and do not reflect subsequent changes to the electronic document. Touch screens may enable the application of manual annotations to the electronic document. Oftentimes, the electronic document may be modified in consideration of the prior annotations. As such, it may be beneficial to modify the prior annotations to the electronic document to improve coherency of the prior annotations in light of subsequent modifications to the electronic document.

[0004] This section is intended to introduce the reader to various aspects of art that may be related to various aspects of the present disclosure, which are described and/or claimed below. This discussion is believed to be helpful in providing the reader with background information to facilitate a better understanding of the various aspects of the present disclosure. Accordingly, it should be understood that these statements are to be read in this light, and not as admissions of prior art.

SUMMARY

[0005] A summary of certain embodiments disclosed herein is set forth below. It should be understood that these aspects are presented merely to provide the reader with a brief summary of these certain embodiments and that these aspects are not intended to limit the scope of this disclosure. Indeed, this disclosure may encompass a variety of aspects that may not be set forth below.

[0006] The present disclosure relates to systems and methods for associating manual annotations generated via annotation inputs with document data of an electronic document for storage of the document data with the manual annotations generated via the stylus inputs. The systems and methods described herein may enable the manual annotations to be automatically modified to improve coherency in light of subsequent modifications to the document data. For example, a user may provide an annotation input to manu-ally annotate an electronic document shown as an image on the display of an electronic device. Annotation inputs may be provided by a user in various manners, including but not limited to, a stylus (e.g., Apple Pencil®), one or more fingers of the user, a mouse, trackball, or a trackpad. As discussed in detail below, properties of the annotation inputs for the manual annotations may be used to cluster multiple separate annotation inputs together, thereby enabling the cluster of annotation inputs to be treated as one manual annotation or comment rather than a plurality of separate manual annotations. Annotation inputs may be clustered together based at least in part on the location of the annotation inputs relative to one another and the timing between annotation inputs. The properties (e.g., path shape, location) of the annotation inputs may be utilized to anchor one or more annotation inputs to an anchor location relative to one or more objects of the electronic document. The properties of the annotation inputs may also be utilized to associate one or more annotation inputs with an anchor range of text. For example, a shape (e.g., underline, strikethrough, enclosure, bracket) of a path of the one or more annotation inputs may identify the anchor range of text. Additionally, or in the alternative, an order of a plurality of annotation inputs may identify an anchor location and/or an anchor range of text. In some embodiments, one annotation input of multiple annotation inputs grouped into a cluster may be an identifying annotation input that identifies an anchor location and/or an anchor range based at least in part on a path shape (e.g., underline, strikethrough, enclosure, bracket) of the identifying annotation input. Moreover, a location of one or more annotation inputs relative to one or more objects or a margin of the electronic document may determine the anchor location for the respective one or more annotation inputs.

[0007] The annotation inputs that are associated with an anchor location within an image of the electronic document may be modified to reflect subsequent modifications to the electronic document. For example, moving text at an anchor location associated with a callout annotation may move the callout annotation. Furthermore, the annotation inputs that are associated with an anchor range may be modified to reflect subsequent expansions, contractions, or removal of the one or more objects of the electronic document within the anchor range. For example, adding text to a phrase within an anchor range that is associated with an enclosure annotation may expand the enclosure annotation to enclose the original text and the added text. Furthermore, subsequent deletion of characters associated with a strikethrough annotation may delete the strikethrough annotation as well. Accordingly, the annotation inputs to the electronic document may be dynamic, thereby enabling the annotation inputs to maintain coherency with the electronic document despite subsequent modification of the electronic document.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] Various aspects of this disclosure may be better understood upon reading the following detailed description and upon reference to the drawings in which:

[0009] FIG. 1 is a block diagram of an electronic device that may use the techniques disclosed herein, in accordance with one or more embodiments of the present disclosure;

[0010] FIG. 2 is a front view of a handheld device, such as an iPhone® by Apple

[0011] Inc., representing an example of the electronic device of FIG. 1;